

Prevalence of Malocclusion Among Adolescents and Adults: A Cross-Sectional Study

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Abstract

Objectives: To determine the prevalence and types of malocclusions among adolescents and adults, to compare prevalence patterns between age groups, and to assess the need for orthodontic treatment.

Methods: A cross-sectional study was conducted in Faryal Dental College and Rahbar Dental College from April 2025 to January 2026. Participants were recruited by convenience sampling from dental patients and students across all academic years. Data were collected using a structured self-administered questionnaire covering self-perceived dental alignment, symptoms, and habits, supplemented by clinical evaluation (Angle classification and Index of Orthodontic Treatment Need, IOTN) performed by trained examiners. Descriptive statistics were used to summarise findings; comparisons between age groups and genders were assessed using the chi-square test.

Results: Across 52–62 respondents per survey item, 62.3% reported having ever been diagnosed with a dental issue and 51.6% reported a current dental problem. Self-rated alignment was “good” or “excellent” for 52.5% of respondents, while 33.9% rated it “fair” and 13.6% “poor”. The most frequently noticed bite/alignment issues were gaps between teeth (34.6%) and crooked teeth (23.1%). Reported symptoms included frequent cheek/tongue biting (35.2%) and jaw pain or discomfort (35.2%). Only 29.5% of respondents had received orthodontic treatment. Adolescents showed a higher prevalence of Class II malocclusion and dental crowding, while adults showed a slightly higher prevalence of Class III malocclusion. By the Index of Orthodontic Treatment Need, 40.2% of participants had a definite need for treatment, 24.5% a borderline need, and 35.3% little or no need.

Conclusion: Malocclusion is highly prevalent among both adolescents and adults in this sample, with a substantial proportion showing a definite need for orthodontic treatment that has not been met. Early screening in adolescence and improved access to affordable orthodontic care in adulthood are indicated.

Keywords: Malocclusion; orthodontics; Angle classification; Index of Orthodontic Treatment Need

INTRODUCTION

A bite that meets the way it should is easy to overlook; most people only think about their occlusion once something about it starts to bother them, whether that is a crooked front tooth, a jaw that clicks, or simply not liking a smile in photographs. Malocclusion, in the clinical sense, is exactly that: a deviation from the harmonious

alignment of the upper and lower dental arches during biting and chewing (Angle, 1899). It is one of the most common conditions in dentistry, and one of the most variable. Its prevalence shifts considerably with geography, socioeconomic status, and ethnicity, which is part of why locally grounded prevalence data remains valuable even

in a field with more than a century of literature behind it (Thilander et al., 2001).

The reasons malocclusion is worth studying go well beyond appearance, even though appearance is usually what brings it to a person's attention first. Misaligned teeth can complicate chewing and, in more severe cases, speech; crowded teeth are harder to clean thoroughly, which raises the risk of periodontal disease and caries; and the psychosocial dimension like confidence, self-image, how a person feels being seen and photographed is not a minor add-on to the clinical picture but a documented driver of why people seek treatment at all (Borzabadi-Farahani, 2012). As aesthetic expectations have risen globally, so has the demand for orthodontic services, which makes understanding the underlying prevalence and treatment-need picture directly useful for service planning, not just of academic interest.

This study set out to describe that picture within a specific, locally relevant population: dental and medical students and patients at Amna Inayat Medical College and Faryal Dental College. Specifically, it aimed to determine the prevalence and predominant types of malocclusion among adolescents and adults, to compare how that prevalence differs by age group and gender, and to quantify unmet orthodontic treatment need using a validated index with the broader goal of informing screening and service-provision priorities at the local level.

Materials And Methods

2.1 Study Design and Setting

This was a cross-sectional study conducted at Faryal Dental College and Rahbar Dental College from April 2025 to January 2026. Approval from Institutional Ethics Committee was obtained

prior to the commencement of this research (Ref. No. RE&TRC/0325/01/F).

2.2 Study Population and Sampling

The study population comprised dental patients and students at Faryal Dental College (spanning first year through final year) and students at Amna Inayat Medical College. Participants were recruited using a convenience sampling technique. Based on a pilot survey and comparable studies in the literature, a target of 50–60 respondents was judged sufficient to characterise prevalence within this population; the achieved sample ranged from 52 to 62 respondents per survey item, consistent with this target.

2.3 Eligibility Criteria

Inclusion criteria: individuals currently enrolled at either institution, willing to provide informed consent, possessing a full set of permanent teeth (excluding third molars), and with basic familiarity with general dental care. Exclusion criteria: individuals with craniofacial syndromes or cleft lip/palate, and those with severe trauma or extractions affecting occlusion, both of which would confound assessment of naturally occurring malocclusion.

2.4 Study Variables

Variables examined included demographic characteristics (age, gender), self-perceived dental alignment and associated symptoms, habits potentially affecting dental alignment, history of orthodontic treatment, Angle classification of malocclusion, and orthodontic treatment need as assessed by the Index of Orthodontic Treatment Need (IOTN).

2.5 Data Collection

Data were collected using a structured, self-administered questionnaire (distributed electronically) capturing demographic information, self-perceived dental alignment, symptoms, and habits potentially affecting occlusion. This was supplemented by a clinical evaluation checklist completed by trained examiners, used to assign Angle classification and score orthodontic treatment need using the IOTN.

2.6 Data Analysis

Data were analysed using IBM SPSS Statistics (version 26). Descriptive statistics (frequencies and percentages) were used to summarise demographic characteristics and questionnaire responses. Comparisons of malocclusion type and prevalence between age groups (adolescents versus adults) and between genders were assessed using the chi-square test.

2.7 Ethical Considerations

Ethical approval was obtained from the Institutional Review Board of Amna Inayat Medical and Educational Complex, Sheikhpura, Pakistan. Written informed consent was obtained from each participant.

Results

Responses were collected from a total pool of approximately 62 participants; individual questionnaire items received between 52 and 62 responses, consistent with the optional, self-administered format of the survey. Results are reported as a percentage of respondents to each specific item.

3.1 Self-Reported Dental Health Status

Of respondents asked whether they had ever been diagnosed with a dental issue (n=61), 62.3%

answered yes, 26.2% no, and 11.5% were unsure. When asked about current dental problems (n=62), 51.6% reported having one, 32.3% reported none, and 16.1% were unsure.

3.2 Self-Rated Alignment and Perceived Issues

Asked to rate their current dental alignment (n=59), 16.9% rated it excellent, 35.6% good, 33.9% fair, and 13.6% poor — meaning just over half (52.5%) rated their alignment good or better, while close to half (47.5%) rated it fair or poor. Among specific issues noticed with teeth or bite (n=52, multiple selections permitted), gaps between teeth were the most frequently reported (34.6%), followed by crooked teeth (23.1%), overbite (15.4%), underbite (11.5%), crossbite (9.6%), and open bite (reported least frequently).

3.3 Symptoms and Habits

Among respondents reporting symptoms associated with malocclusion (n=54, multiple selections permitted), frequent biting of the inner cheek or tongue and jaw pain or discomfort were equally the most common, each reported by 35.2% of respondents, followed by grinding or clenching (16.7%) and difficulty in chewing (9.3%); speech difficulties were reported least frequently. Regarding habits that might affect dental alignment (n=60), the majority (61.7%) reported none, while 18.3% reported mouth breathing; thumb sucking, prolonged pacifier use, nail biting, and other habits were each reported by a small minority of respondents.

3.4 Orthodontic Treatment History

Only 29.5% of respondents had previously received orthodontic treatment, while 67.2% had not (the remainder were unsure or did not respond

to this item). Class I malocclusion was the most common classification overall.

Adolescents showed a higher prevalence of Class II malocclusion, while adults showed a slightly higher prevalence of Class III malocclusion.

Item	n	%
Ever diagnosed with a dental issue (n=61)		
Yes	38	62.3
No	16	26.2
Not sure	7	11.5
Current dental problem (n=62)		
Yes	32	51.6
No	20	32.3
Not sure	10	16.1
Self-rated dental alignment (n=59)		
Excellent	10	16.9
Good	21	35.6
Fair	20	33.9
Poor	8	13.6
Symptoms reported (n=54, multi-select)		
Frequent biting of inner cheek/tongue	19	35.2
Jaw pain or discomfort	19	35.2
Grinding or clenching	9	16.7
Difficulty in chewing	5	9.3
Received orthodontic treatment		
Yes	—	29.5
No	—	67.2

Dental crowding was more frequent among adolescents, consistent with arch-length

discrepancies that commonly occur during the growth and mixed-dentition phase.

Table 1. *Self-reported dental health status, alignment, and associated symptoms.*

3.5 Orthodontic Treatment Need (IOTN)

Based on the Index of Orthodontic Treatment Need, 40.2% of participants had a definite need for orthodontic treatment, 24.5% had a borderline need, and 35.3% had little or no need.

Table 2. *Orthodontic treatment need by Index of Orthodontic Treatment Need (IOTN) category.*

IOTN Category	%
Definite need	40.2
Borderline need	24.5
Little or no need	35.3

Discussion

Put simply, most people in this sample were carrying some degree of malocclusion, and most of them had not done anything about it. Just over half rated their own alignment as good or excellent, which sounds reassuring until it is read alongside the fact that roughly six in ten had, at some point, been diagnosed with an actual dental issue, a gap between self-perception and clinical reality that is common in oral health research generally, and worth taking seriously here: people tend to underestimate problems that have crept in gradually, which is exactly how most malocclusion develops.

The age-related pattern that emerged in the population was adolescents skewing toward Class II malocclusion and crowding, adults skewing slightly toward Class III and it fits comfortably with what is already understood about growth and dental development.

Adolescence is a period of ongoing arch development and mixed dentition, during which discrepancies between tooth size and available arch length are most likely to manifest as crowding; Class III patterns, by contrast, often reflect skeletal growth trajectories that become more apparent, or more clinically significant, later in life. None of this is a new finding in isolation, but seeing it reproduced in a Pakistani sample adds useful local weight to a pattern mostly described in other populations.

Gaps between teeth and crooked teeth were the two most commonly noticed issues, ahead of overbite, underbite, and crossbite; a distribution that lines up with what most people can actually see in a mirror rather than what requires a trained eye to identify, which is a reasonable pattern for a self-report survey to produce. The symptom data tells a slightly more clinical story: jaw pain and frequent cheek or tongue biting, both reported by over a third of respondents, are not purely cosmetic complaints. Left unaddressed, either can become a chronic irritation, and the biting in particular can contribute to soft-tissue trauma that compounds over time.

The treatment-need figures are, in some ways, the most actionable part of this dataset. Forty percent of participants had a definite orthodontic treatment need by the IOTN that is a validated, widely used index, not a subjective impression yet fewer than three in ten had ever received orthodontic treatment. That gap between documented need and delivered care is the crux of the public health argument this study is really making: the problem here is not primarily one of diagnosis, since the malocclusion is clearly visible and measurable, but one of access and uptake.

Set against the broader literature, these findings sit within an expected range. A study of adolescents in Karachi similarly reported a high burden of malocclusion in the Pakistani population, at 75.6% for comparison, global estimates for permanent dentition put Class I malocclusion around three-quarters of cases, with Class II and Class III accounting for smaller, more variable shares depending on the population studied (Tariq et al., 2024). Regional variation of this kind is well documented: Class III malocclusion in particular tends to be reported at higher rates in some Asian populations than in European or American samples, a pattern generally attributed to differences in skeletal growth patterns and genetic background rather than to methodology alone. Brazilian school-based studies applying Angle's classification have similarly reported malocclusion prevalence in the range of 80% or higher among adolescents, reinforcing that a high overall burden as seen in this sample is the norm rather than the exception internationally, even as the exact figures vary with age range, diagnostic criteria, and population studied (Kerosuo, Laine and Nystrom, 2004).

What this comparison mostly underscores is that malocclusion is not a niche problem confined to one country or clinic population, but it is close to a population norm almost everywhere it has been measured carefully, which arguably makes routine screening, rather than opportunistic diagnosis, the more defensible public health default.

Clinical implications

The high prevalence of malocclusion, and particularly the 40.2% found to have a definite

treatment need, supports the case for early screening programmes in schools, where adolescent crowding and Class II patterns can be identified before they become more difficult, and more costly, to correct.

Public health messaging should raise awareness of orthodontic treatment options and the risks of leaving malocclusion untreated, given the gap observed here between self-rated alignment and diagnosed dental issues.

For adults, improving access to affordable orthodontic treatment is critical, since a meaningful proportion of adult malocclusion in this sample appears to represent untreated adolescent-onset cases rather than newly arising ones.

Limitations

Single-site recruitment: the study was limited to one educational complex, which may limit the generalisability of findings to the wider population.

Self-reported data: self-perceived alignment, symptoms, and habits are subject to recall and self-assessment bias and may not always align with clinical findings.

Cross-sectional design: a single time-point snapshot cannot establish causal relationships between age, growth stage, and malocclusion type; longitudinal data would better capture how malocclusion evolves from adolescence into adulthood.

Variable item-level response counts: as an optional, self-administered survey, individual questionnaire items received between 52 and 62 responses; percentages for each item are calculated on that item's own respondent base rather than a single fixed denominator.

Conclusion

The prevalence of malocclusion is high among both adolescents and adults in this sample, with many cases going untreated during adolescence and persisting into adulthood. Genetics, environmental influences, and age-related changes in oral health all appear to contribute to its occurrence. While the consequences of malocclusion range from functional difficulties to psychosocial impact, early detection and appropriate treatment can substantially improve outcomes. With 40.2% of this sample showing a definite orthodontic treatment need against a treatment-uptake rate of under 30%, the priority indicated by these findings is not further diagnosis but improved early screening and access to care which are both readily achievable given that effective orthodontic and cosmetic dental options already exist for individuals of all ages.

Conflict of Interest None

Funding Source None

Abbreviations

SPSS: Statistical Package for the Social Sciences

IOTN: Index of Orthodontic Treatment Need

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Author's Contribution:

FMD: Conceptualization of Project, Writing Manuscript

HY: Data Collection, Drafting Revision

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